

## CLAIMS

What is claimed:

1           1.     A virtual storage system for linking a host to one or more  
2 storage devices over a network, the system comprising:  
3           an agent connected to the host, the agent having volatile memory  
4 for storing a first copy of a table, the table having entries to map virtual  
5 disk positions to locations on the storage devices; and  
6           a controller coupled to the agent, the controller having non-volatile  
7 memory for storing a second copy of the table, the controller intermittently  
8 causing contents of the first copy of the table to be replaced by contents of  
9 the second copy of the table,  
10          whereby during an input/output (I/O) operation, the host accesses  
11 one of the entries in the table stored on the agent to determine one of the  
12 storage device locations.

1           2.     The system of claim 1, wherein the table entries further  
2 include an indication of whether an invalid state is activated such that the  
3 invalid state for a table entry becomes activated when that table entry  
4 contains no useable mapping information.

1           3.     The system of claim 2, wherein the agent does not allow the  
2 host to complete the I/O operations with one of the entries if the invalid  
3 state for that entry is activated.

1           4.     The system of claim 1, wherein the table entries further  
2 include an indication of whether a no-write state is activated such that the  
3 no-write state for one of the entries becomes activated when data cannot  
4 be written to the storage location contained in that entry.





4           accessing a table mapping the block to a storage location on a  
5 storage device;  
6           issuing a corresponding operation to the storage device, wherein the  
7 corresponding operation correlates to the operation on the virtual disk;  
8           completing the corresponding operation; and  
9           presenting the completed corresponding operation to the virtual  
10 disk.

1           25.    The method of claim 24, wherein the issuing step includes  
2 issuing the corresponding operation from an agent coupled to the host.

1           26.    The method of claim 24, further comprising updating the  
2 table with a persistently-stored table residing in a non-volatile memory.

1           27.    The method of claim 24, further comprising determining  
2 states of the table.

1           28.    The method of claim 24, further comprising sending a fault  
2 message when the table is unable to be accessed.

1           29.    The method of claim 24, further comprising storing the table  
2 in a volatile memory.

1           30.    The method of claim 24, receiving updates for the table from  
2 a controller.

1           31.    A method for maintaining a table for mapping virtual disk  
2 blocks to storage locations on storage devices within a network,  
3 comprising:  
4           receiving a command from a controller at an agent storing the table;  
5           activating states within entries of the table;  
6           completing operations at the table; and  
7           updating the table in response to the command.

1           32.    The method of claim 31, further comprising setting a blocking  
2 flag until operations are completed.

1           33.    The method of claim 31, further comprising obtaining  
2 mapping information from one of the entries in the table.

1           34.    A computer program product comprising a computer useable  
2 medium having computer readable code embodied therein for performing  
3 an operation on a virtual disk coupled to a host within a network, the  
4 computer program product adapted when run on a computer to effect steps  
5 including:

6               specifying a block on the virtual disk within the operation;

7               accessing a table mapping the block to a storage location on a  
8 storage device;

9               issuing a corresponding operation to the storage device, wherein the  
10 corresponding operation correlates to the operation on the virtual disk;

11              completing the corresponding operation; and

12              presenting the completed corresponding operation to the virtual  
13 disk.

1           35.    A computer program product comprising a computer useable  
2 medium having computer readable code embodied therein for maintaining  
3 a table for mapping virtual disk blocks to storage locations on storage  
4 devices within a network, the computer program product adapted when  
5 run on a computer to effect steps including:

6               receiving a command from a controller at an agent storing the table;

7               activating states within entries of the table;

8               completing operations at the table; and

9               updating the table in response to the command.